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THE CONTROL OF BOVINE MASTITIS*

BY

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INTRODUCTION

I have used as a title for this talk "The Control of Bovine Mastitis" rather than "The Eradication of Bovine Mastitis." Mastitis is similar to "the Poor," we shall always have it with us. But it is possible to reduce the loss which results from this disease and the purpose of this paper is to show the various ways in which mastitis, when it occurs as a herd problem, can be controlled.

Mastitis, as you all know, is not a disease caused by one species of organism. In fact it can and does occur in many different forms and can be caused by a large variety of organisms. Further, from many cases of acute clinical mastitis it is not possible to recover any pathogens. Thus we talk of specific and non-specific mastitis according to whether we recover organisms from the milk or not. Specific mastitis we split up into the various types such as streptococcal mastitis, staphylococcal mastitis, tuberculous mastitis and so on.

I feel that a better approach to the problem is an epidemiological one and I prefer to consider mastitis as it occurs in the milking-cow as appearing in two main types, a contagious and a non-contagious one.

By contagious mastitis is meant that type which is readily spread from cow to cow by indirect contact during milking, either by means of the milker's hands, udder cloths or teat-clusters. In non-contagious mastitis there is little tendency or none to spread from an infected cow to a free one and cases which arise are sporadic as a general rule. In many cases, however, this type of mastitis may appear as a herd problem; I should like, nevertheless, to deal first with contagious mastitis before discussing this subject.

INCIDENCE OF *Str. agalactiae*

When one talks about contagious and non-contagious mastitis it must be borne in mind that there is no hard and fast dividing line—it is merely a question of degree, but the one organism which is pre-eminently a contagious one is *Str. agalactiae*. I have chosen to talk about this organism first because, as I shall show, it is still the commonest pathogen occurring in cases of bovine mastitis and the one which has been engaging our attention more particularly in recent years. If we were to analyse the bacteriological findings from clinical cases and calculate the percentage of these due to *Str. agalactiae* we should see a great change in the last few years. Thus in a survey of 2,000 clinical cases carried out in 1944, 42 per cent. of all cases were due to *Str. agalactiae* while another survey carried out this year showed only 5 per cent. of cases due to this organism. The natural deduction to make from these figures is that the havoc wrought by *Str. agalactiae* is on the wane, but this may be misleading. Recently a research worker in mastitis from another area of England showed me just such figures as these, from the clinical cases he had received from his district, and argued that he had no *Str. agalactiae* problem to deal with. He was working in a district where milk was produced on a commercial basis, and my experience of such areas has always been that *Str. agalactiae* infection is predominant. I suggested to him that he should conduct a random survey of herds in the district and not merely sample herds where a mastitis problem was alleged. He did so and he was able to disclose that more than 20 per cent. of the animals tested were infected with this organism. As this was a random survey we can consider this figure to be a relatively accurate one for that district.

Two surveys have been carried out at Weybridge to determine the incidence of *Str. agalactiae* infection in two counties close to the laboratory, namely, Herts and Surrey. In Hertfordshire the selection of the herds to be sampled was carried out by the Statistical Department at the Rothampstead Institute and was a random sample of all the herds in the county. In Surrey approximately half of the attested herds were chosen and an equal number of non-attested herds.

TABLE I

	Surrey	Herts
Number of herds examined	207	125
Number and percentage of herds infected with *Str. agalactiae* ...	134 (64·7%)	85 (68%)
Number of cows examined	4,636	2,292
Number and percentage of cows infected	657 (14·2%)	347 (15·1%)

As has been seen from the table, a marked similarity in the results was revealed, showing that in both counties a high percentage of herds were infected and that the individual cow figures were also approximately equal and not inconsiderable.

In more than 30 per cent. of the herds the degree of infection was above 20 per cent. of cows.

Surrey and Herts are somewhat similar counties as to type of farming and one would expect the figures to be approximately equal, as in fact they are. A small survey was also carried out in an area where the herds are small and stock-rearing predominates. Here only 7 per cent. of the cows and 30 per cent. of the herds were infected. Thus it is apparent that this type of mastitis is a disease of intensive milk production. I have talked about the incidence of this infection, but what harm does it do to the cow?

PATHOGENESIS OF *Str. agalactiae*

Str. agalactiae can produce many types of clinical disturbance in the cow—even a very acute type with rapid and complete loss of the quarter infected—but its usual method of attack is a much more insidious one. This organism gets its living out of the udder and your educated parasite does not commit suicide by producing such a reaction in the

* Address to the meeting of the Yorkshire V.M.S., at Leeds, November 16th, 1951.

cow that both the udder and itself are destroyed. It is important here to distinguish between infection and invasion. Some animals can excrete large numbers of this organism with no evidence of mastitis either during life or at *post-mortem* examination. Thus some cows can carry this infection without any visible signs because there is in fact *no* mastitis. The danger of such a cow is that she represents a reservoir of infection to be transmitted to her more susceptible sisters. When infection passes into invasion the disease normally progresses very slowly and we get a catarrhal type of inflammation spreading lobule by lobule throughout the udder tissue with resulting loss in milk-yield. This chronic change in the udder may be accompanied by clots in the foremilk but in many cases no such signs are obvious; thus it will be seen that the strip-cup while picking out some early cases of mastitis will also miss many. My own opinion is that the strip-cup is a very inefficient weapon in the check of the disease.

Spread of Infection

I have said that this type of mastitis is contagious; it is spread from an infected animal to a clean one by indirect contact. It is not an infectious disease like tuberculosis where there are many routes for the organism to invade the body. Here there is only one route, via the teat canal, and infection will occur only when the teats of a cow are brought into contact with infected material. Thus the hands of a milker or teat-clusters are the main offenders in passing the infection within a herd. It is interesting to compare the relative danger of spread of infection according to whether the herd is hand-milked or machine-milked. In an experiment carried out over two years by Lancaster and Stuart at Weybridge a herd of 18 cows was hand-milked during the first year. These animals were all free from infection at the start of the experiment and the milkers immersed their hands in infected milk before milking each cow. In the course of 15 weeks, 12 cows became infected. These cows were freed from infection again and the following year they were machine-milked, each cluster being dipped in infected milk before being put on each cow. In the same time only six cows were infected although the cows were a year older and presumably more susceptible to infection. This indicates that infection is much more readily transmitted by hand than by machine. It has been suggested that this might be due to a time factor since it takes longer to milk a cow by hand than by machine, but this is not my opinion and later in this paper I will produce evidence to show that it is hand-milking *per se* which is the important factor in spread of *Str. agalactiae*.

It should be realised that a cow is susceptible to mastitis from the day she is born. At birth she has an immature udder composed of a duct system and patent teat canals. If calves are allowed to suck one another after sucking an infected cow or (and much more likely) having been bucket-fed with infected milk, it is possible for one calf to implant *Str. agalactiae* in the udder of the other. The organism can remain there until the animal matures, when she will calve down with the infection in her milk. She will not necessarily have mastitis and heifers have great powers of self-cure, so that the infection may disappear in two or three weeks, but she may reintroduce the infection into the herd and her more susceptible companions will pick it up very readily. Probably this is not very common, but it has been the reason for the reintroduction of infection in some herds which are under supervision at Weybridge.

Control Measures

Is it possible to control this type of mastitis by attention to management and hygiene? It has been suggested that milking the cows according to age, heifers first and old cows last along with any known clinical case, would do something to check the spread. This may be true in a machine-milked herd but is generally untrue in a hand-milked herd or even one which is hand-stripped. It should also be borne in mind that many infected cows do not show symptoms and that even heifers may be infected.

Hygienic measures can play a part and the dipping of clusters between cows probably helps to reduce the number of organisms on the cluster. I say *reduce*—and not sterilise—advisedly, because the use of hypochlorites in the manner prescribed by the makers does not sterilise the units. A further objection to them is that they are defatting agents and produce dry teats which are subject to teat-sores. We have not yet discovered the ideal disinfectant for use in the cowshed to combat the spread of mastitis organisms. It had been hoped that cetavlon would provide the answer but while it is a more efficient bactericide of mastitis organisms, it is even more of a defatting agent and it is much more expensive to use. It is also not so good as the hypochlorites in killing those organisms which are mainly responsible for the poor keeping quality of milk, and the main reason for dipping teat-clusters is to ensure clean-milk production, *not* to prevent mastitis.

Since management and hygienic precautions are of limited value in preventing spread of infection we are left with three possible courses to adopt.

(1) Removal of all infected cows. This is a very expensive method and while it can be justified in the case of tuberculosis where there is a danger to human life, no such consideration obtains in the case of *Str. agalactiae*.

(2) Vaccination. One of the outstanding features of this type of mastitis is the apparent failure of any cow to acquire natural immunity from an attack of the disease. Rather does the cow appear more susceptible to subsequent attacks. More recently, Pattison at Compton has shown that it is possible to vaccinate goats with *Str. agalactiae* and protect them from an attack of the disease by the homologous strain. This protection is only strain specific and the work has not been repeated in cows, but it has shown the possibility of creating an immunity to this type of mastitis. These goats were not immune to *infection*. Many goats which were vaccinated still secreted the organism in the milk but no attacks of mastitis developed and there was no diminution in milk-yield.

It is probable that a similar state of affairs occurs in cattle as I have noticed that in some herds which had had blitz treatment with penicillin but where the infection persisted, clinical symptoms vanished although in a few weeks' time the number of cows infected was the same as before they were treated. However, at the moment vaccination is not a practical proposition although it may become so in a few years.

(3) Treatment. There is no doubt that prompt treatment of every clinical case of mastitis will reduce considerably the losses from this disease. However, the infection still persists and as I have mentioned already, a great proportion of the damage done is sub-clinical. Thus it is essential to have a means of diagnosis of all infected cows and to have a method of treatment which will be as close to 100 per cent. successful as possible. For diagnosis of infected cows there is no adequate substitute for bacteriological examination of milk samples. The strip-cup will miss at least half the

infected cows and as it is commonly used in cowsheds, probably does more harm than good since it will facilitate spread of infection.

Until the 1930s treatment of mastitis was largely empirical but, firstly, the acridine dyes such as acriflavin and, secondly, sulphanilamide were introduced. These two forms of treatment were a major step forward but they have now been largely superseded. The dyes proved too irritant to use in an udder which was actually secreting milk and sulphanilamide given by the mouth has grave disadvantages. It depresses the milk-yield, produces a very sick cow and in many cases, while a clinical cure resulted, the bacteria were still left in the udder to produce a further outbreak when conditions became suitable. Furthermore, bacteria exposed to this drug gradually learned to overcome it and the position arose that it was of no further use.

Treatment with Penicillin

With the introduction of penicillin came the biggest advance in the treatment of mastitis. Here was a substance which seemed the complete answer to our problem. It is entirely non-irritant, it is cheap and is extremely active against most mastitis organisms. Nor are we faced with the serious fault of the sulphonamides in the development of resistant strains. *Str. agalactiae* has never been found to be naturally resistant to penicillin nor does it develop any resistance as the result of prolonged treatment.

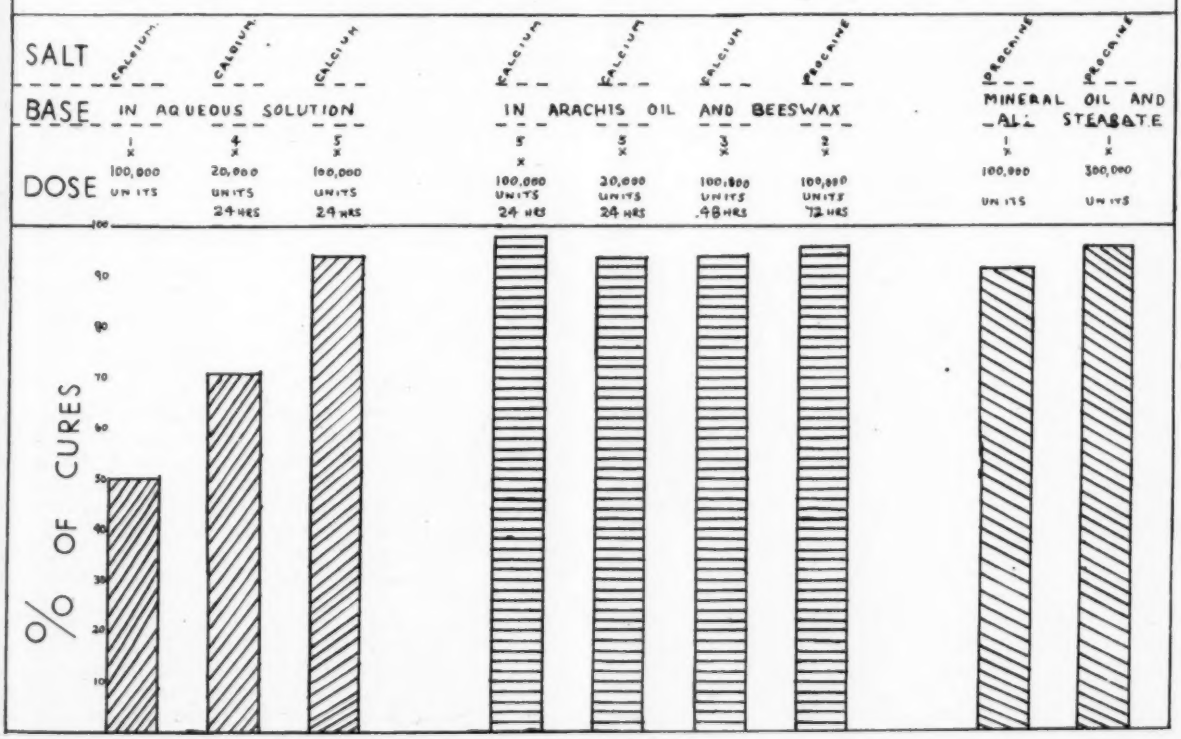
In the diagram is shown a summary of the work which was done in trying to establish the optimum dose of penicillin for eradicating *Str. agalactiae* from infected cows. It will be seen from the first two columns that the size of the dose is not nearly so important as the length of time that it is acting. This is explained by the work of Eagle and Musselman, who showed that the maximum killing-rate of penicillin of *Str. agalactiae* was achieved at a very low level and as the level of penicillin was increased, the killing-rate was decreased. This zonal effect is obtained with some other organisms and in most sensitive organisms the optimum killing-rate is achieved by a low level of penicillin with no increase in activity no matter how much the dose is increased. Thus in all probability small doses frequently infused are the best means to employ in treating clinical cases, but where herd treatment is concerned such a method would be too expensive and time-consuming. Accordingly, we are making use of the more insoluble salts suspended in a base which will release it only slowly over a period of days. The progress of this work is shown in the succeeding columns of the diagram and it will be seen that all these different doses give approximately the same level of cure. What is not shown is the length of time that the penicillin is present at the various doses. Our aim has always been to maintain a bactericidal level in the udder for as long as possible—at least six days—and when one reduces the number of treatments to one tube per quarter it is necessary in some cows to increase the dose to 300,000 units. However, I am going a bit ahead of the development of herd treatment with penicillin.

Herd Eradication

When Lancaster and Stuart had infected the cows in their

DIAGRAM NO: 1.

TREATMENT OF STR: AGALACTIÆ WITH PENICILLIN.



experiment, they wished to remove the infection so that they could start again, using the same cows. Concurrently with their work, Chodkowski had shown that in the cow-shed there was extensive infection of the teats, the milking utensils and even the air of the shed. Accordingly, it was decided to treat all cows, whether infected or not, with 100,000 units of penicillin per quarter daily for five days and on the fifth day all the cows were thoroughly hosed down with a hypochlorite disinfectant and the cow-sheds and utensils were treated with a cresol type of disinfectant. The result of this was so successful that Dr. Stableforth decided to carry out a small-scale field experiment using badly infected herds and giving them the same treatment. The results of this work were sufficiently encouraging for us to carry out further treatments on other groups of 10 herds but in each group we tried to simplify the treatment, by reducing the number of doses, the size of the dose and in one group omitting the disinfection. The results obtained were very similar, some 85 per cent. of infected cows being cured by each method, but least effective was the treatment where the penicillin was in the udder for the shortest time and not where the smallest dose was used. During this period we had changed from using watery solutions of penicillin to oil-wax suspensions and it became clear that while the main object of the change was to combat the introduction of primary tuberculosis of the udder, it had the advantage of keeping the penicillin in the udder for a much longer time. From here, as I have mentioned before, was developed the use of insoluble salts of penicillin in oily bases, so that from using five doses at 24-hour intervals we are now close to the time when it will be possible to remove *Str. agalactiae* from a herd by a single dose into each quarter of every cow. I have been talking about badly infected herds but it is quite possible in the more lightly infected herds to remove the infection by treatment of infected cows only.

Difficulties in Eradication

If I have given the impression that this eradication is easy then I have perhaps been too optimistic. There are three things which militate against successful eradication:—

(1) The presence in the herd of chronically infected cows which resist treatment and re-infect other cows once the penicillin has disappeared from the udders.

(2) The presence of teat-sores which can harbour infection with *Str. agalactiae* indefinitely.

(3) The persistence of *Str. agalactiae* infection on milkers' hands.

I should like to point out here that it is possible to free a herd from *Str. agalactiae* because it is an obligatory parasite of the udder and will live and multiply only in the udder or on teat-sores. The milkers' hands can carry this infection for some little time but the organism never establishes itself as one of the normal flora of the human skin. Neave at Shinfield has shown that the human throat can also harbour an organism which is in fact *Str. agalactiae* but it is a human type and is not readily transmissible to cows.

Because of the danger of re-infection, the necessity for fairly frequent *post-mortem* examinations of milk-samples is obvious. This examination is now a fairly simple one, using the sample-jars devised at Weybridge, and at the various Veterinary Investigation Centres we are now in a position to examine an almost unlimited number of samples. At the present time we examine samples two weeks after treatment and then at two-monthly intervals until two consecutive tests are clear, the herd being examined once a year thereafter. Provided reasonable precautions are observed these herds should remain free from this infection for all time.

Being faced with a heavily infected herd and having decided to "blitz" it, what are the chances of success? This will depend upon the three points which I mentioned concerning the presence of chronically infected cows, infected teat-sores and infected hands of milkers. This last point is probably the most important because it is the one most difficult to deal with. Hands are notoriously difficult to disinfect and thus it is important to keep them away from the udder as much as possible. For this reason I favour machine-milking without hand-stripping. Edwards at Compton has attempted to remove *Str. agalactiae* from 10 herds, five of which were machine-milked, two hand-stripped and three hand-milked. At his last examination not one cow in the five machine-milked herds was infected while the other herds were as badly infected as before with the exception of one of the hand-stripped herds which had stopped this practice with a subsequent rapid decline in the number of infected cows. Examining the herds which have been in the Surrey Scheme for a year on the same basis we got the following figures.

Table II

Method of milking	Number of herds	Pre-treatment		Post-treatment	
		Infected	Clear	Infected	Clear
Hand-milked ...	273	172 (63%)	101	38 (14%)	235
Machine-milked, hand-stripping	122	83 (68%)	39	29 (23·7%)	93
Machine-milked, no stripping	189	110 (58·2%)	79	15 (8%)	164
Totals ...	584	365 (62·3%)	219	82 (14%)	492

Though not so spectacular as Dr. Edwards' results, the conclusion is none the less clear that it is much easier to remove the infection from herds which are machine-milked. Just why this should be I cannot say. The suggestion has been made that machines are easier to disinfect than hands, but I have pointed out that the common disinfectants in use are not fully effective in sterilising teat-clusters and in the second transmission experiment of Lancaster and Stuart the teat-clusters were artificially infected and yet did not prove so effective in spreading infection as did hand-milking.

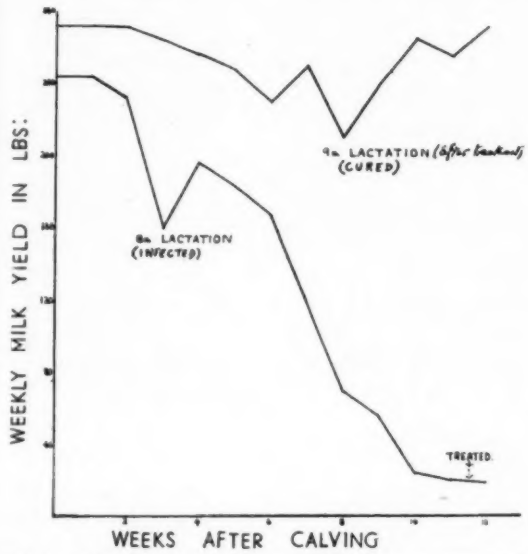
Effect of Treatment

What is the effect of treatment? The first obvious thing is an immediate improvement in the clinical mastitis position; by blitzing a herd, however, one does not necessarily produce a dramatic immediate improvement in milk-yield. Certainly there may be some slight improvement due to some of the pre-functional lobules becoming active, but marked improvement in yield is generally not observed until the next lactation. This is well demonstrated in the following graph.

It will be seen that a cow infected with mastitis throughout its eighth lactation and treated before it went dry, calved down into its ninth lactation with an increased milk-yield and gave more than double the milk in the first 12 weeks of this lactation that it did in the same time in the previous one.

GRAPH NO: 1

EFFECT OF TREATMENT OF MASTITIS ON MILK YIELD.



(Ninth lactation shows a marked improvement as compared with the eighth, during which treatment was given.)

When given on a herd basis the results may be very spectacular: to quote one herd which was composed of 26 cows—mainly non-pedigree Shorthorns with a few Friesians. In the year before treatment was carried out the cows' average was 630 gallons, in the year of treatment 660 gallons and in the first year after treatment 970 gallons. In the year following that it was 1,080 gallons and the owner is insistent that this improvement is almost entirely due to the solving of his mastitis problem. There are many faults that can be found in this method of estimating the effect of treatment on milk-yield. Management and feeding could change, there may have been a change of cowman, there may have been a sterility problem and so on. None of these factors operated in regard to the results I have just given. They might, however, do so in other herds and so we must analyse the effects on milk-yields in another way.

This can be done by comparing the milk-yields of infected cows and clean cows in the same herds in which no treatment has been carried out. Here we are not determining the increase in yield as a result of treatment but rather the *loss* in yield which this infection produces. Since infected and clean cows are in the same herds, any of the variables which I have just mentioned should affect them equally.

TABLE III

Degree of infection	1948–49		1949–50		Alteration in average yield
	No. of cows	Average yield in lb.	No. of cows	Average yield in lb.	
Negative in three or four tests	189	30·40	137	32·20	+ 1·8
Infected in one or two tests	141	33·16	47	33·07	— 0·09
Infected in three or four tests	16	28·85	9	27·17	— 1·68

Infections with Other Organisms

I have spent the greater part of the time available to me on *Str. agalactiae* mastitis, but I do not apologise for this because I think that I have shown that it is still the main type of mastitis in this country and is responsible for an enormous loss in milk every year. If this were the only organism producing mastitis then our problem would be a relatively simple one, but the variety of organisms recovered from cases of mastitis is very wide indeed. Certain organisms predominate, however, and these are haemolytic staphylococci, *Str. uberis* and *Str. dysgalactiae*. These, as you are aware, are the bacteria most frequently recovered from cases of mastitis which fail to respond to penicillin therapy. This, as a general rule, is not due to any resistance on the part of the organism, as both *Str. dysgalactiae* and *Str. uberis* are always sensitive and the majority of haemolytic staphylococci are also sensitive to penicillin. Penicillin relies for its action in the udder on its diffusibility but if the reaction produced in the udder is severe, it will not be able to reach all the foci of infection and consequently fails to cure the condition.

These organisms differ from *Str. agalactiae* in one important respect; they are not obligatory parasites of the udder and can live and multiply on the intact skin. Staphylococci found in bovine mastitis are not purely bovine species—they can infect human beings and milkers can carry these organisms in their nostrils and throats. *Str. dysgalactiae* is found in diseases of pigs and sheep and also in the tonsils of the cow, while *Str. uberis* is nothing more nor less than a dust organism and is ubiquitous. To attempt to eradicate these organisms from herds is obviously impossible and the method of control must be different. I am referring here, of course, to herd treatment and not merely to sporadic cases of mastitis. Where numerous cases of mastitis are occurring in milking cows in the same herd, it points to the presence of some factor which is helping to upset the host-parasite relationship in favour of the parasite.

Association of Mastitis with Milking Technique

After some herds had been treated with penicillin and *Str. agalactiae* removed, it was found that there was still a mastitis problem. Bacteriological examination of milk-samples showed no consistent pathogen, haemolytic staphylococci, *Str. uberis* and *Str. dysgalactiae* occurring in different clinical cases, while from many milk-samples it was not possible to recover any organism whatsoever. Most of these cases were not acute and the only visible signs were slight swelling, a few clots in the foremilk and often only slight decrease in the milk-yield. Occasionally there was a spread up into the quarter and a more severe type of mastitis ensued but this occurred much more frequently in heifers than in older cows.

A significant fact about these herds was that they were all machine-milked herds, and with one exception, all were using machines in which the liners were of the moulded type. Another point which was common to all the herds was that the milking time per cow was long. What was happening was that the clusters were left too long on the

teats of the cows, and after the milk flow had ceased, the cups crept up the sides of the teats and damaged the sensitive tissues inside the udder. The reason why liners creep lies in the design. A teat-liner should fit the teat like the finger of a glove so that there is no escape of the vacuum up the sides of the teat. For milking efficiency the vacuum should be applied at the teat-sphincter but if the liner is not a close fit on the teat then the vacuum is applied at the base of the teat and as the pressure inside the udder drops the teat is drawn further into the liner. It is not necessary to have a fully stretched liner to stop this creeping as some moulded liners have been designed in recent years which have been a suitable answer to the problem.

The first herd which had this trouble and which was brought to my notice was a herd which we had successfully "blitzed" but which had 23 cases of clinical mastitis in 24 cows in three months. All the common pathogens except *Str. agalactiae* were found and 12 of the cases were sterile on culture. The herd was a bad one to milk by machine, being divided between three sheds and two loose-boxes and the milking time per cow was slow (12 minutes per cow). In this instance, all three sets of liners were changed and there was an immediate improvement, there being only two very mild cases of mastitis in the next three months.

Since an obvious objection to any claim for this change of liner is that it might have been a coincidence, it was decided to stage some form of controlled experiment when the next herd with this trouble presented itself. Accordingly, in the next herd of 40 milking cows in which four units were used, only one unit was changed to new liners and the same 10 cows were milked with this unit throughout a lactation. In this group only one case of mastitis occurred, while in the remaining 30 cows there were 20 clinical cases during this lactation.

During the following year a further unit was altered and once again only one case of clinical mastitis appeared in this group while the group milked with the old liners had 12 cases. This would appear to be conclusive proof that teat-liner design has some influence on the occurrence of mastitis. It certainly convinced the makers of the old liner and they have produced an entirely new one.

However, there appears to be another solution to this problem and that is to ensure that the cows are milked quickly. Usually this does *not* mean a reduction in the total milking time but that the time the unit is on each cow is reduced. This can be done by ensuring that the cowman is not asked to use too many units. If a man is milking his cows single-handed then one unit is as much as he can operate efficiently. If two men are employed, then one man should operate two units and do one other job, preferably feeding concentrates, while the other man washes the cows, uses the strip-cup (if used), carries and weighs the milk and changes the churns. If a man is not asked to do any other job but operate units then he can use three, but that is the maximum number with which he can work efficiently. It is well known that heifers are quicker than older cows and that there are some cows which will never milk out properly to a machine, but the aim should be to milk 10 cows per unit per hour and if it is less than that, then it is too slow.

Summer Mastitis

Lastly, I should like to mention briefly summer mastitis because I am aware that in certain parts of Yorkshire it is very prevalent. I do not think treatment is very hopeful once clinical signs are obvious. The damage has been done and it is a question of saving the animal's life and preventing spread to the unaffected quarters. Of recent years it has been shown by Wright and Arthur, by Stuart and by Pearson that other organisms besides *Corynebacterium pyogenes* are associated in the disease and the picture would appear to be different in various areas. While Stuart had four organisms in varying combinations in his cases, *viz.*, *C. pyogenes*, *Str. dysgalactiae*, an anaerobic streptococcus (*Str. indolicus*) and a symbiote growing in association with the other organisms, Pearson has so far failed to recover this anaerobic streptococcus, or the symbiote.

Hitherto, attempts at producing immunity using toxoid or vaccine have failed but this new insight into the bacterial picture raises hopes that we may yet be able to immunise cattle against this disease.

You are no doubt aware that attempts have been made to protect cattle in the dry period, using either single or multiple doses of penicillin. Unfortunately, large-scale field trials to determine the efficiency of this protection in Great Britain coincided with seasons of remarkably low incidence of the disease, whilst Pearson in Northern Ireland had better luck and was able to show almost 100 per cent. protection.

Summarising briefly, one can say that the correct method of control of *Str. agalactiae* is to examine the cows bacteriologically and treat with penicillin either all the cows or only the infected ones, according to the degree of infection. Further short-interval sampling is essential to check that the infection has been removed entirely. For the other types of infection occurring as a herd problem in milking cows, attention to management and more particularly milking technique is generally beneficial. For summer mastitis infusing the cow's udder during the dry period is apparently of great benefit, but the adoption of this practice would depend upon the incidence.

Treatment of Rabies

A new development in the treatment of rabies was described at a conference sponsored by the World Health Organisation and held at the Pasteur Institute in Coonoor, Southern India.* A serum, prepared from the blood of horses whose immunity to rabies virus has been raised by repeated vaccination, is under trial in Iran. It is being given to people who have been attacked by rabid wolves. Incidentally, it seems that a bite from one of these animals is more often the cause of a fatal infection than the bite of an infected dog. Hitherto treatment has involved daily vaccination for two to three weeks with a vaccine usually obtained from the brain of an infected sheep. But the method is not altogether satisfactory; for one thing the use of the vaccine occasionally promotes the formation of demyelinating antibodies which may cause paralysis. Though no results of the trial have yet been reported, there are good hopes that the serum may prove a simpler and safer means of reducing the mortality of rabies, which is responsible for about 3,000 deaths every year in India alone. The serum is not yet available commercially.—*The Lancet.*

New York Times, August 7th, 1952, p.7.

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Mr. J. Arthur Rank, Chairman of the Animal Health Trust's Executive Committee, has given £1,000 for the purchase of essential scientific equipment for the Trust's research stations at Houghton, Hunts, to enable their programme to be more rapidly pursued.

* * * * *

Weekly Wisdom

The goat that reeks on yonder hill
Has browsed all day on chlorophyll.—R. W. Marsh (*News Chronicle*, July 30th).

CLINICAL COMMUNICATION

THE TREATMENT OF AURAL HAEMATOMA IN THE CAT

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Haematoma of the ear in the cat is the sequel to head shaking frequently caused by irritation and the accumulation of debris in the external auditory canal. Capillary extravasation occurs on the internal aspect of the concha between the integument and the cartilage.

Frequently *Otodectes cyanotis* can be demonstrated and must be regarded as an exciting cause, and consequently part of the treatment consists of the elimination of these parasites. This alone, however, is merely a palliative measure once haematoma formation has occurred and if the ear is not drained absorption is slow and crinkling of the ear is an inevitable sequel. At the same time the weight of the unopened haematoma is often a source of annoyance to the patient and self-inflicted injury to the ear can easily lead to cartilage necrosis.

It is our view that the only satisfactory treatment for this condition is radical surgery, bearing in mind that it can be regarded as satisfactory only if the normal shape of the ear is preserved. After treating six cases of unilateral haematoma we are satisfied that the technique as described fulfils these requirements.

The essential part of the treatment consists of supplying support to the conchal cartilage during the process of healing. This has been recognised for some time, as witnessed by the efforts of Gray (1929), by the use of ear clamps, and more recently by stainless steel sutures, Zepp (1949).

The method of treatment outlined below was described as having been successful in his hands by Professor C. Formston at the International Veterinary Congress, 1949. It consists of incision and drainage of the haematoma followed by fixation of the integument, and giving support to the concha by means of a silver-wire frame.

This method has been applied successfully to five out of six cases, in cats between 1 and 10 years old. The concha in the unsuccessful case crinkled because the cat removed the wire frame the day after the operation, and so this case may be regarded as a useful control (Fig. 1). The wire frame is extremely light in nature and the remainder of the cats in the series presented have tolerated the frame without sedatives. However, hospitalisation is advisable to enable early administration of sedatives or application of an Elizabethian collar to a difficult patient, should it be deemed necessary.

FIG. 1.
Nine-year-old spayed female. Left ear crinkled—one month after treatment.

OPERATIVE TECHNIQUE

The cat is anaesthetised, using either nembutal intravenously or ether (by inhalation), the mask in the latter case not interfering greatly with the operation site.

The hair on the inner aspect of the ear is clipped and the external auditory meatus cleaned, using 33⅓ per cent. benzyl benzoate emulsion. The auditory meatus is plugged with cotton wool to prevent the influx of blood during the operation, and, after a final cleaning of the integument with 70 per cent. alcohol, a single drape is applied with a central opening to admit the ear.

The haematoma is punctured in the mid-line of its ventral pole and its contents expressed. An incision is then made along the whole length of the haematoma from the puncture wound, all fibrin removed, and an ⅛-inch strip of integument removed from each wound edge. Excessive haemorrhage may be controlled by applying a Makin's bowel clamp at the base of the ear.

The haematoma cavity is occluded with a series of No. 4 nylon mattress sutures which pass through the whole thickness of the concha and are tied on its outer aspect. Approximately 10 sutures are so placed, all parallel to the wound (Fig. 2), and it is essential that they should not be tied too tightly or pressure necrosis will occur.

The silver-wire (No. 20 standard wire gauge) frame is then sutured in position on the inner aspect of the ear, approximately ¼ inch from the outer edge, using No. 3 nylon mattress sutures which pass through the concha and are tied on its outer aspect. The ends of the wire are turned back on themselves to prevent excoriation (Fig. 2). When the suturing has been completed the ear is moulded to its correct position by shaping the wire frame.

Post-operative treatment consists of the removal of any blood extravasation, which usually ceases after 24 hours.

The wire frame and sutures are removed a week after the operation, at which time the concha will be erect but slightly thickened.

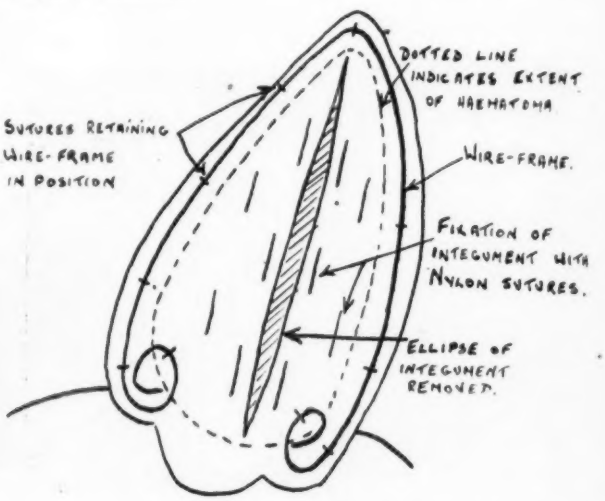
DOTTED LINE INDICATES EXTENT OF HAEMATOMA
SUTURES RETAINING WIRE-FRAME IN POSITION
WIRE-FRAME.
FIXATION OF INTEGUMENT WITH NYLON SUTURES.
ELLIPSE OF INTEGUMENT REMOVED.

FIG. 2.
Diagram to show suturing and position of wire-frame.

The following two cases are representative of those treated.

CASE NO. 1

Subject.—A two-year-old, white, spayed female, with a haematoma affecting the right ear.

History.—The haematoma was first noticed on February 26th, 1952, and was treated by the technique described above on February 28th. After an uneventful post-operative period the wire frame and the sutures were removed on March 9th when the ear was erect and slightly thickened. The cat was presented for examination on May 13th when the ear was erect and of normal thickness (Figs. 3, 4, 5 and 6).

CASE NO. 2

Subject.—A nine-year-old, ginger, neutered male, with a haematoma affecting the left ear.

History.—The haematoma was treated by the described technique on March 5th, 1952. When the frame and sutures were removed on March 11th the ear was erect and thickened. On May 13th the ear was erect and not thickened (Fig. 7).

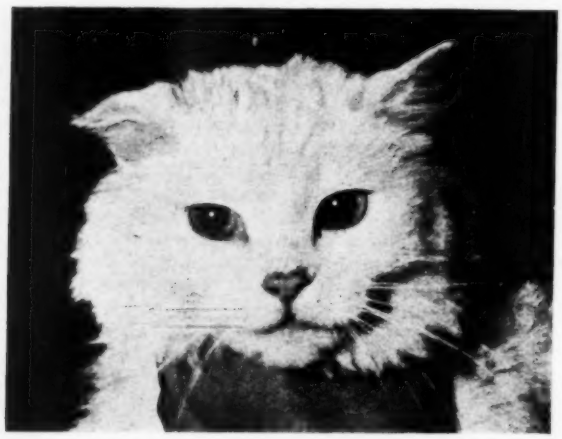

FIG. 3
Case No. 1.—Haematoma of right ear before operation.

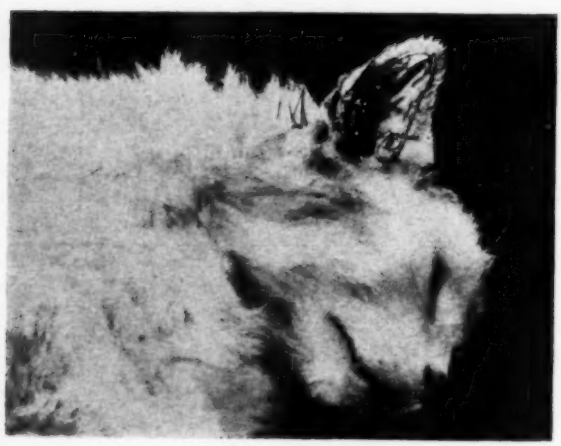

FIG. 4.
Case No. 1.—Immediately after operation.

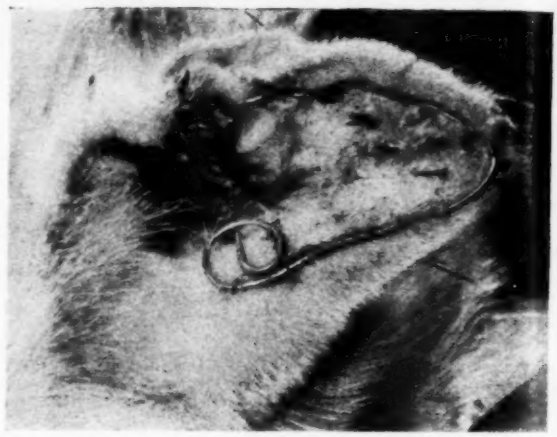

FIG. 5.
Case No. 1.—Right ear immediately before removal of sutures and wire frame.

FIG. 6.
Case No. 1.—Wire frame removed—right ear erect.

FIG. 7.
Case No. 2.—Two months after treatment of haematoma of left ear.

Acknowledgments.—We would like to express our thanks to Mr. P. Henfrey for the photographs.

REFERENCES

FORMSTON, C. (1949.) *Vet. Rec.* **61.** 646.
GRAY, H. (1929.) *Ibid.* **9.** 397.
ZEPP, C. P. (1949.) *Ibid.* **61.** 647.

ABSTRACTS

Incidence and Control of Bovine Mastitis*

This symposium on mastitis consisted of a number of contributions based on different aspects of the problem: (1) the research approach, (2) the application of research in the field, (3) the viewpoint of the practising veterinarian and (4) the farmer's experience in the south of England and south-west Scotland.

(1) Stableforth presented a considerable amount of useful information on the extent of infection and on the losses due to the disease. The influence of treatment in improving the milk yield of *Str. agalactiae*-infected cows was also illustrated. This author gave brief descriptions of the various common types of mastitis infections, completing his contribution by an account of modern methods of control and treatment.

(2) Macpherson described large-scale attempts to control the disease in 145 herds by regular laboratory testing coupled with treatment of varying degrees of thoroughness. He also presented figures on the incidence of infection. Itemised suggestions for control were given.

(3) Gould stressed the importance of management, particularly in the use of the milking machine. He pointed out that in those herds in which *Str. agalactiae* had been controlled or from which it had been eradicated an entirely different mastitis picture may supervene. Acute sporadic cases, which are not so easy to treat, appear to be more common, although their numbers may be reduced by changes in management.

(4) Trehane and Ross stressed many of the farmer's difficulties. The former made the point that the need for mastitis eradication and control must be decided in the light of the farmer's circumstances—in some cases the effort was not always justified. He considered that nutrition was of importance in controlling the disease. Both contributors emphasised the importance of management.

In these papers and the following discussion many important points were brought out including the need or not for foremilk stripping, the use of hypochlorite in udder washing, the danger of certain types of milking machine and the possible resistance of certain organisms to penicillin.

These interesting papers should be read by all those concerned with the problem of mastitis.

D. L. H.

* **The Incidence and Control of Bovine Mastitis.** Various authors. (1951.) *Proc. Brit. Soc. Anim. Prod.* Published 1952; pp. 7–57.

* * * * *

Technique for the Collection and Transfusion of Blood in Cattle*

The advantages of whole blood transfusion in the treatment of such conditions as bovine anaplasmosis, debility, haemorrhage, etc., are well appreciated, but practical difficulties attending the collection and delivery of an adequate volume in emergency have so far discouraged the general application of this procedure.

The apparatus described consists essentially of a 4-litre aspirator bottle connected at the neck to a vacuum-pressure hand pump and at the base to a length of tubing to which is attached a suitable intravenous needle. 400 c.c. of a 2½ per cent. sodium citrate solution are first poured into the bottle, allowing some of the solution to coat the inside of the inlet tube and needle. After attachment to the venous circulation as few as 25 slow strokes of the hand pump are needed to deliver 1 gallon of blood within six to eight minutes.

The transfusion of blood necessitates changing the rubber tubing from the vacuum to the pressure side of the pump, at the same time substituting a filtration tube for the observation window.

Those interested in the technique are advised to consult the excellent diagrams illustrating the original paper.

J. P.

* **A Technique for the Collection and Transfusion of Blood in Cattle.** Simpson, F. C., Sanders, D. A., & French, R. B. (1952.) *J. Amer. vet. Med. Ass.* **120.** 17–19.

* * * * *

Carbohydrate Metabolism in the Bovine*

The oral administration of glucose to calves up to 50 weeks old gives a greater and more persistent rise in blood sugar than it does in adult cows when doses of approximately 4·5 g. per kg. are used. The response in adults with this rate of dosage is small; twice the dose, however, may produce large but transient increases in blood sugar. A marked increase in acetone bodies occurs in the urine of adults but not in the urine of calves. Previous reports suggesting the formation of acetone bodies in the rumen were not confirmed, in that none could be detected in the rumen liquor following the administration of glucose by mouth. It is concluded that the short chain fatty acids formed in the rumen as a result of the fermentation of glucose are the precursors of the urinary ketones produced, but the site of their conversion is the liver. It is suggested that the oral administration of glucose in the treatment of ketosis is contra-indicated on account of the ketogenic response.

A. T. P.

* **Carbohydrate Metabolism in the Bovine. III.—Glucose by Mouth.** Holmes, J. R. (1952.) *J. comp. Path.* **62.** 41–53.

REPORT

[Society for the Protection of Animals in North Africa: Annual Report for 1951.]

In the various towns and villages of North Africa many thousands of mules, horses, donkeys, camels, goats, cattle, sheep, dogs and cats have received urgently needed first-aid, and a lesser number sustained hospital treatment, mainly by a devoted band of voluntary workers. The total number of treatments given during the year was 184,344, truly a stupendous effort.

No one knows better than the reviewer what sad lives of toil and pain all animals endure in the heat and dust of North Africa, and how urgently in need of help and sympathy they always are.

The Society pays great attention to education of children and adults alike in the need for kindness and tolerance towards animals, £2,900 having been spent towards this end. Almost the only point of view the average Arab appreciates is that by keeping his animal in good health and good condition he can get more work out of it. Nothing else matters to him.

We in England do not know the meaning of "cruelty to animals" until we have seen the North African brand, some of the victims of which would sicken the toughest veterinarian accustomed to the sight of disease and tissue destruction. It is heartening to read that subscriptions and donations for 1951 amounted to £5,238 and legacies £44,540; but expenses are heavy and there is much room for expansion. Miss Hosali and her capable team of helpers are to be congratulated on their continued success in the management of this most important charitable institution.

H. K.

VICTORIA VETERINARY BENEVOLENT FUND

MEETING OF COUNCIL

A meeting of the Council of the Victoria Veterinary Benevolent Fund was held at No. 10, Red Lion Square, London, W.C.1, on Tuesday, July 1st, 1952, when the following members were present: Professor J. B. Buxton (President), in the chair; Professors J. McCunn, C. W. Ottaway, G. H. Wooldridge and Major W. H. Wortley. Mr. C. W. Francis, Secretary, was in attendance.

The minutes of the previous meeting, held on April 4th, 1952, having been published, were taken as read and signed as correct.

Mr. Arnold Spicer

The President stated that as this was the first Council meeting after the June annual general meeting, he would like to take the opportunity of bringing to the notice of the meeting that Mr. Arnold Spicer had been an *ex-officio* Member of Council under Article 18 (*b*) for nearly 30 years, he having during that period held the offices of President (1945-50), Vice-President (1923-30), Hon. Treasurer (1930-45), and Hon. Secretary (1950-52)—a truly remarkable record. By Mr. Spicer's generous decision in not seeking re-election as Hon. Secretary at the recent annual general meeting in order that a younger member should fill this position, he was *ipso facto* no longer an *ex-officio* member. In the circumstances, the President felt confident everyone would agree that Mr. Spicer ought to remain on the Council in order that we should continue to have the benefit of his vast experience and wise counsels at our deliberations, and he therefore proposed from the chair that Mr. Arnold Spicer be elected a co-opted member. This proposition was warmly supported by Professor G. H. Wooldridge, and on being put to the meeting was unanimously carried.

Letters of apology for absence were received from the following:—Messrs. E. P. Barrett, A. J. Beeson, H. Bell, H. W. Dawes, Mrs D. I. Glover, Professor R. E. Glover, Messrs. G. N. Gould, G. P. Male, Professor W. M. Mitchell, Captains J. W. Procter, Wm. Watt, Professor W. L. Weipers, Captain A. Whicher and Mrs. M. E. Wright (President, Ladies' Guild).

Ladies' Guild Summer Gifts.—The Secretary reported that in accordance with the expressed wishes of the Ladies' Guild, on June 25th the Executive Committee distributed to 32 recipients the sum of £253 in gifts ranging from £15 to £5. Letters of appreciation and warm thanks received from the recipients were passed round to the Council, after which it was agreed that the letters be sent to Mrs. D. I. Glover, Treasurer of the Ladies' Guild.

Accountant's Report

The Secretary read the following report submitted by the Accountant, which was approved, a vote of thanks being accorded to the respective donors:—

Since the previous meeting of Council the following special subscription and donations have been received:—

Subscription

Southern Counties Veterinary Society ...	£10	10	0

Donations

Collecting Boxes

Eastern Counties Veterinary Society	9	13	0
Scottish Metropolitan Division	2	2	6
Society of Women Veterinary Surgeons ...	1	10	7
	13	6	1

"In Memory of Colonel P. J. Simpson"

Miss F. M. Bridgern ...	1	1	0
Captain A. Whicher	2	2	0
	3	3	0
Bexhill Horse Show (per Captain A. Whicher)	1	1	0
Mrs. D. E. E. Goodhugh	0	10	6
Lincolnshire and District Veterinary Society	5	0	0
Mr. W. P. McMillan	5	0	0
North of Ireland Veterinary Medical Association	20	0	0
Scottish Metropolitan Division (surplus from Dinner given in honour of Mr. J. W. Mitchie)	1	1	0
Total (Donations)	£49	1	7

Additional Annual Subscriptions by Deed of Covenant

One new subscription for	£2	2	0
Two „ subscriptions „	1	1	0
One „ subscription „	0	10	6

Investments.—The Treasurer was authorised to invest the amount of £274 16s. 2d. standing in the Donations Account in a suitable Government security.

Cases

No. 127. Daughters of late member; ages respectively 74 and 76. The Secretary reported that one of these ladies died on June 16th, 1952, and that her sister had asked if part of the grant could be continued. After reviewing all the facts of the case it was decided to continue the present grant of 30s.

No. 241. Widow; aged 59. Four children, three sons and one daughter, ages 27, 25, 21 and 23 respectively. As instructed by the Council in January, this case was again considered and, having regard to the information contained in a letter from the recipient of June 20th, it was decided that the grant be now discontinued.

No. 284. M.R.C.V.S.; aged 70. Compelled to give up practice owing to an accident. The Secretary reported that the instructions given at the last meeting had been duly carried out, and on reading a letter from the recipient conveying to the Council his grateful thanks for the assistance given him, the meeting expressed its sincere appreciation to the member resident in the locality of this case for his invaluable help in this matter.

No. 246. Widow; aged 70. Receiving grant of £1 per week. One daughter, aged 35, suffering from ill-health. An application having been made for an increased grant, it was decided that upon receipt of information regarding her present financial circumstances, the matter be referred to the Executive Committee with power to act.

No. 285. Widow; aged 78. Husband died June 5th, 1952. Three daughters, two sons. The Secretary explained that one of the sons called upon him two weeks ago in regard to the position of his mother, and to enquire if financial assistance could be given in her case. An application form was given to him for completion, but this had not yet been returned. It was resolved "That if an application should be received before the next meeting, it be referred to the Executive Committee with power to act."

Date of Next Meeting.—It was decided that the date of the next Council meeting be left in the hands of the President and Secretary, who shall, if possible, arrange for it to be held during the September quarterly meetings of the R.C.V.S.

NOTES AND NEWS

Diary of Events

Sept. 7th—13th.—Seventieth Annual General Meeting and Congress of the British Veterinary Association, at Harrogate.

Sept. 11th.—Annual General Meeting and Dinner of the Royal "Dick" Alumnus Association, at Harrogate. (See Notice.)

Sept. 11th.—Meeting of the Society of Practising Veterinary Surgeons, at Harrogate (Majestic Hotel), 2.45 p.m. Meeting of Council, 2.15 p.m.

Sept. 12th.—Annual General Meeting of the Association of Veterinary Teachers and Research Workers, at Harrogate (Municipal Building, Council Chamber), 2.30 p.m.

Sept. 19th and 20th.—Meeting of The Biochemical Society, in the Department of Biochemistry, The University, Glasgow, 11 a.m. both days.

Sept. 22nd.—Annual General Meeting of the Veterinary Section of the Universities Federation for Animal Welfare, at Westham House, Barford, near Warwick, 2 p.m. (See Notice.)

Sept. 24th.—Meeting of the R.A.V.C. Division of the B.V.A. at the Equine Research Station of the Animal Health Trust, Newmarket, 11.15 a.m.

Oct. 8th.—Meeting of the Editorial Committee, B.V.A., at 36, Gordon Square, W.C.1, 2 p.m.; Executive Committee to follow immediately. N.B. *There will be no meeting of either the Editorial Committee or its Executive Sub-committee in September.*

Oct. 23rd.—Annual Dinner and Dance of the Midland Counties Division, B.V.A., at Birmingham (Midland Hotel); Reception, 7.30 p.m.

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The Harrogate Congress

Members attending Congress are asked to note that the Secretary's office will be located in the Royal Hall, telephone number Harrogate 3480.

Dr. Kesteven's address, at 2.15 p.m. on Monday, September 8th, will be delivered in the Lounge Hall, Parliament Street, and not in the Royal Hall as announced in the Congress programme.

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Foot-and-Mouth Disease Enquiry

Shortly after we went to Press with our last issue the Ministry of Agriculture announced the membership of the Committee that is to review the policy and arrangements for dealing with foot-and-mouth disease in Britain. The Committee will advise whether any changes should be made in the light of present scientific knowledge and the technical and administrative experience gained in recent years in this and other countries.

The Committee is constituted as follows: Sir Ernest Gowers, G.B.E., K.C.B. (Chairman); Professor E. D. Adrian, O.M., M.A., M.D., F.R.S., F.R.C.P.; Colonel H. Cator, M.C.; Ll. Wyn Griffith, Esq., O.B.E., D.Lit.; Lord Hungarton; Professor A. Robertson, B.Sc., M.R.C.V.S.; A. R. Semple, Esq., and H. Woolley, Esq.

Mr. R. A. Thorne, M.B.E., of the Ministry of Agriculture and Fisheries, has been appointed Secretary to the Committee. Communications should be addressed to him at Hook Rise, Tolworth, Surbiton, Surrey.

Biographical Notes

Sir Ernest Gowers is a former Civil Servant of wide experience. During the war he was Senior Regional Commissioner for the Civil Defence of London. He has been Chairman of many Commissions and Committees including, more recently, the Committee on the Preservation of Historic Houses and the Royal Commission on Capital Punishment.

Professor E. D. Adrian is an eminent Cambridge scientist who has been honoured by many learned foundations both in this country and abroad. He is President of the Royal Society and was appointed last year as Master of Trinity College, Cambridge.

Colonel H. Cator is a well-known Norfolk landowner and farmer who was President of the Royal Agricultural Society of England in 1951.

Mr. Ll. Wyn Griffith is well known as a broadcaster and writer on Welsh cultural affairs. He is also a member of the Advisory Committee of the Glanllyn Estate.

Lord Hungarton has farmed in Leicestershire for many years and is at present Chairman and Managing Director of an agricultural engineering business. He was a County Councillor from 1936 until 1946 and was Chairman of the Leicestershire County Branch of the National Farmers' Union of England and Wales in 1937. He has served on the Leicestershire County Agricultural Executive Committee since 1939.

Professor A. Robertson is head of the Department of Hygiene and Preventive Medicine at the Royal (Dick) School of Veterinary Studies of Edinburgh University.

Mr. A. R. Semple, a Dumfriesshire farmer, is a past President of the National Farmers' Union of Scotland. He was the founder and original Chairman of the Dumfriesshire Cattle Breeders' Association, the first A.I. centre to be set up in Scotland.

Mr. H. Woolley, who farms in Cheshire, is a past Deputy President of the National Farmers' Union of England and Wales and for some years has been Chairman of the Union's Parliamentary Committee. He is also a member of several of its other Committees including the Diseases of Animals Committee.

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R.C.V.S. OBITUARY

Peddie, James, T.D., F.R.C.V.S., 136, High Street, Inverurie, Aberdeenshire, Major R.A.V.C. (retd.). Graduated Edinburgh, December 17th, 1889; Fellowship May 13th, 1896. Died August 24th, 1952; aged 84 years.

. . . . .

The Late Major James Peddie, T.D., F.R.C.V.S.

We record above with deep regret the death of Major James Peddie, of Inverurie, a Fellow who was also a member of the Examining Board of the Royal College of Veterinary Surgeons from 1907 to 1922. This highly esteemed practitioner, after some years' residence in Dundee, lived for a period in Caterham in Surrey. On the death of his wife in 1909, however, he returned to Scotland, practising at Inverurie for many years prior to his retirement, and living there until his death at the age of 84 years. Major Peddie died in an Aberdeen nursing home and many friends attended his funeral there on Wednesday, August 27th.

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The Late Mr. Ralph Bennett, F.R.C.V.S.

Mr. Ralph Bennett, F.R.C.V.S., whose death at Hove we recorded with deep regret in our last issue, was born at Havering in 1883. He was the third son of Mr. J. H. Bennett, who was practising, as his father had done, in that village and Romford. Later, Ralph was educated at the City of London School and graduated in 1904 from the Royal Veterinary College, entering into partnership with his father. Five years later he took his Fellowship.

In 1910 he was married at St. Edward's Church, Romford, to Constance Elkington, a member of another well-known local family. His war service consisted of four years with the Royal Army Veterinary Corps and included two and a half years in the Middle East.

In 1919 he became a Freeman of the City of London. The following year his father retired, and Mr. Ralph Bennett took over entirely the practice at 48, Hornchurch Road (later to become part of South Street). He was for some time a Governor of St. Edward's School, Romford. In 1947 he retired and a year later moved to Hove.

Tributes

Mr. Campbell Dickson, M.R.C.V.S., writes from Johannesburg: "With the death at Hove on August 20th, 1952, of Ralph Bennett, F.R.C.V.S., our profession has suffered a sad loss and his passing brings to an end a worthy line of veterinary surgeons. It was in 1839 that 'R.B.'s' grandfather received his diploma. Some 30 years later his son qualified in London and the family tradition was maintained when Ralph took first his Membership Diploma in 1904 to be followed later by his Fellowship.

"During the first world war Ralph Bennett saw service with the R.A.V.C. in the Middle East, and on demobilisation he took up the reins once more in the long-established family practice in Romford, Essex, where, for nearly 30 years, he practised until his retirement in 1947.

"He was never blessed with robust health but in spite of this handicap he maintained the highest traditions of our profession and won the esteem and friendship of his many farming clients by his sound, painstaking and honest capabilities.

"It was my privilege to serve under 'R.B.' for a number of years

and a newly qualified veterinary surgeon could have wished for no finer tutor to guide him either in the acquisition of scientific knowledge or in the more subtle art of meeting and handling the public in a manner that redounded to the credit of our profession. Through the long war years I came to know 'R.B.' not only as a principal but as a kindly, considerate and sincere friend.

"His death, which comes as a sad personal loss, also removes from the profession one of the older generation the passing of which leaves us all the poorer."

From the neighbouring town to Romford, namely, Harold Wood, Mr. R. G. MARES, M.R.C.V.S., writes: "The sease of family tradition in the practice was strong; the first Bennett's diploma hung on the surgery wall and some of the first stock bottles were still on the shelves. Ralph Bennett himself always drove in gloves, a habit acquired from driving his father in the days of the horse. He was a man of character running a practice of character. I must have learnt much from him as a student but it is the little marks of a strong character that stick in the memory."

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GENERAL OBITUARY

MR. ARTHUR CROXTON SMITH, O.B.E.

Many of our readers who, knowing Mr. Croxton Smith, held him in the highest regard, will have been grieved to learn of his sudden death on August 27th, while on holiday, at the age of 86 years. We record the passing of this most knowledgeable writer on dogs with a special sense of loss in that some years ago he collaborated helpfully in the initial steps taken by the Association to organise effective publicity.

Croxton Smith had been breeding and writing about dogs for some time when the late Lord Burnham invited him to write a weekly article in *The Daily Telegraph*, and in his contributions "Dogs for Sport and Pleasure" we saw the first regular feature devoted to dogs in the daily Press. Since those days he had contributed to a very large number of journals, and for about 10 years until 1941 he wrote regularly on dogs in the columns of *The Times*. Since 1901 he had been a member of the Committee of the Kennel Club. He was Vice-Chairman in 1935, Chairman from 1937 to 1948, and had been a trustee of the club since 1938. One of the first to encourage the use of dogs for police work, he organised many man-hunting trials as Hon. Secretary of the Association of Bloodhound Breeders. For several years he was Chairman of the Tail-Waggers' Club and of the Guide-Dogs for the Blind Association.

A Personal Tribute

MR. S. F. J. HODGMAN, M.R.C.V.S., Past-President of the B.V.A. and a member of the General Committee of the Kennel Club, sends us the following tribute:—

The sudden death of Mr. Arthur Croxton Smith will be felt not only by his many friends, but by all who are interested in the breeding and showing of dogs.

Coming of an old Huntingdonshire agricultural family, Mr. Croxton Smith struck out a line of his own and came to London as a journalist. Family tradition still influenced him and he began writing about dogs, contributing a weekly article, "Dogs for Sport and Pleasure," to *The Daily Telegraph*. The success of this feature encouraged him to specialise, and he published several books that are recognised as standard works of reference on the dog; he also edited the "Hounds and Dogs" section of the Lonsdale Library.

During the 1914-18 war Mr. Croxton Smith was Director of Publicity to the Ministry of Food, and served on several Government Committees. His work was recognised by his creation as O.B.E.

In 1917 there was a Government agitation for the reduction, if not the wholesale destruction, of dogs. Thanks to prompt action of Mr. Croxton Smith and Mr. Sidney Turner, the then Chairman of the Kennel Club Committee, a more reasonable course was adopted, breeding of pedigree dogs being restricted under licence.

In 1942 Mr. Croxton Smith served as the Kennel Club representative on the Committee set up by the Ministry of Food to deal with the number of dogs in the country, and again his more moderate counsels prevailed and proved efficacious.

At the time of his death Mr. Croxton Smith was the oldest member of the Kennel Club, having been elected in 1899, and serving on the Committee since 1901.

By his death the veterinary profession as well as the dog world have lost a wise and generous friend. We both hoped for many years that there might one day be a closer bond between the Kennel Club and the B.V.A., and I am glad that he lived to see the formation of a permanent liaison Committee to promote discussions of problems affecting both.

I am proud to say that Mr. Croxton Smith was my friend for many years and in common with all members of the Kennel Club Committee and his many friends in the veterinary profession I shall feel the loss of his genial personality and wise counsel.

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LEGAL NOTES

Alleged Illegal Practice.—The *Southern Daily Echo* reports that on August 25th the Southampton magistrates issued a warrant for the arrest of Thomas McGowan, Kingsfield Road, Southampton.

McGowan, who did not appear, was alleged to have operated on a dog without using sufficient anaesthetic, and to have practised veterinary surgery without being registered.

Charged with McGowan was William Cole, also of Kingsfield Road.

Mr. Alan Woodford, prosecuting for the Royal College of Veterinary Surgeons, said he knew McGowan had absconded within the last week.

On Mr. Woodford's application the case against both men was adjourned *sine die*.

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FOOT-AND-MOUTH DISEASE

Since our last issue outbreaks of foot-and-mouth disease have occurred in the counties of Gloucestershire, Kent and West Sussex.

Following outbreaks of foot-and-mouth disease in the Channel Islands an Order was made on May 5th prohibiting the landing in Great Britain of animals and hay and straw from those islands. As the islands have been free of the disease for some weeks past, it has been decided to withdraw the importation restrictions, and an Order giving effect to this has accordingly been made by the Minister of Agriculture and Fisheries.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Berks.—Farmoor, North Moreton, Didcot (August 25th).

Ches.—Roughwood Farm, Betchton, Sandbach; 16, Holding Ridley, Tarporley (August 23rd); Dairy House Farm, Brereton, Sandbach (August 26th); Mill Bank Farm, and Grange Farm, Congleton (August 27th).

Devonshire.—Burrator Farm, Buckland Monachorum, Yelverton (August 22nd); Wynyard Farm, Salcombe Regis, Sidmouth (August 26th).

Essex.—Goddard's Farm, Thaxted, Dunmow (August 25th); Kirby's Piggeries, Rochford (August 28th).

Glos.—Bedwell Farm, Farmington, Cheltenham (August 28th).

Hunts.—Audley House, Gt. Gransden, and Hilton Hall, Hilton (August 25th).

Kent.—29, Fox Lane, Keston (August 22nd); Egerton House, Egerton, Ashford (August 23rd); Whitelands, Edenbridge (August 25th).

Lancs.—Hill Top Farm, Withnell, Chorley (August 22nd).

Norfolk.—Dairy Farm, Marsh Road, Halvergate, Norwich (August 25th); The Beeches Farm, Rackheath, Norwich (August 26th); Wood Farm, Ovington, Thetford (August 28th).

Renfrewshire.—Birkenhead Farm, Linwood, Paisley (August 9th).

Rutland.—The Burrows, Preston, Uppingham (August 28th).

Salop.—Park Hall Farm, Northwood, Shrewsbury (August 22nd).

Somersetshire.—Grove Farm, Kingston, Taunton (August 22nd); Westfield House, Keinton Mandeville, Taunton; Green Lane Farm, Stratton-on-the-Fosse, Bath (August 23rd); Charity Farm, Lovington, Castle Cary (August 25th); Fivehead Service Station, Taunton (August 27th).

Suffolk (E.).—Shelley Priory, Hadleigh (August 22nd).

Sussex (E.).—Woodgate Farm, Danehill, Haywards Heath (August 28th).

Sussex (W.).—Grange Farm, South Harting, Petersfield (August 26th).

Yorks (W.R.).—Covey Hall Farm, Weston, Otley (August 27th).

FOOT-AND-MOUTH DISEASE:

Glos.—Home Farm, Upper Slaughter, Cheltenham (August 17th); Eyford Park, Bourton-on-the-Water (September 1st).

Kent.—Chitty Marshes, Chislet, Canterbury (September 1st).

Sussex (W.).—Hyde Farm, Hyde Lane, Upper Beeding, Steyning; Headbone Farm, Lidsey, Bognor Regis (August 27th).

FOWL PEST:

Hants.—Middle Farm, Fair Oak, Eastleigh (August 28th).

Herts.—34, Cannon Road, Watford (August 23rd).

Lancs.—Aintree Hall Farm, Aintree, Liverpool, 9 (August 23rd).

SWINE FEVER:

Essex.—Tey Brook Farm, Tey Brook, Great Tey (August 27th).

Leics.—Tivey's Farm, Shackenstone (August 27th); The Piggeries, Enderby Lane, Thurlaston, Leicester (August 30th).

Lincs.—Toft Tunnel Fen, Brothertoft, Boston (August 27th).

Norfolk.—Merries Farm, Pullover Road, Clenchwarden, King's Lynn (August 28th).

Staffs.—The Bungalow, Bonehill Road, Mile Oak, Tamworth (August 26th); Otherton Farm, Penkridge, Stafford (August 29th).

Warwicks.—King's Arms and Castle Hotel, The Square, Kenilworth (August 25th).

Worcs.—Money Lane, Chadwick, Bromsgrove (August 27th).

Yorks (N.R.).—Cliffe House Farm, Whitwell-on-the-Hill (August 25th).

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BIOLOGICAL STANDARDS

Details of a number of new international standards are contained in the fifth report of the World Health Organisation Expert Committee on Biological Standardisation (*World Health Org. Techn. Rep. Ser.*, 1952, **56**, pp. 23, price 1s. 3d.).

Tetanus Toxoid

An international standard for tetanus toxoid which has an immunising potency similar to current therapeutic preparations has been established. Since there is evidence that the slopes of the dosage-response lines for plain and adsorbed toxoids are closely similar, a single standard can be used for the assay of both preparations. The unit is defined as the immunising activity of 0·03 mg. of the international standard for tetanus toxoid.

Tuberculin

A batch of purified protein derivative of tuberculin, prepared from a human strain of the tubercle bacillus, has been established as the international standard for P.P.D. of mammalian tuberculin and the unitage is to be assigned as soon as possible. The committee has also decided to establish an international standard preparation of P.P.D. of avian tuberculin and have accepted the offer of the existing standard of the Ministry of Agriculture and Fisheries.

Organic Arsenical Substances

The existing joint Canadian-British standard for oxophenarsine has been chosen as the international standard. International reference preparations of two melaminyl trypanocides are to be set up, namely, Melarsen (the sodium salt of *p*-(2:4-diamino-s triazinyl-6-)-aminophenylarsonic acid) and its polymerised antimonial analogue, designated "MSb."

Vitamins

Because about half of the international standard preparation of vitamin A acetate had been used, the committee has authorised the National Institute for Medical Research to proceed with the establishment of the third international standard when necessary. Two preparations will be blended to form the proposed standard for vitamin B_{12} and investigations are proceeding.

Hormones

Since the stock of the international standard for A.C.T.H. is small, the committee has authorised the N.I.M.R. to proceed with the establishment of the second international standard. It has been decided that the standard preparation of thyrotrophin will be a blend of two contributions diluted with an inert substance and put up in tablet form. It is proposed to make the international unit similar to that of the U.S.P. Material for an international standard for growth hormone has been obtained and an investigation of the accuracy of current assay methods for chorionic gonadotrophin has been initiated. The committee has authorised the N.I.M.R., after consultation with the Insulin Committee of the University of Toronto, to establish the third international standard for insulin and to assign to it a unitage on the basis of the result of the collaborative assay. It has been agreed that, in the case of an insulin standard, the batch should be large enough to provide also for standards of preparations of insulin such as protamime-zinc insulin.

Antibiotics

The establishment of the second international standard for penicillin has been authorised. The committee has also established the international reference preparation of penicillin K, but has not defined a unit because at present this preparation is likely to be used mainly for research. Work is proceeding towards the establishment of international standards for dihydrostreptomycin, aureomycin, terramycin, chloramphenicol and bacitracin.

Enzymes

The committee has decided to proceed with the establishment of an international standard for hyaluronidase, and has authorised the N.I.M.R. to institute a collaborative examination of preparations of bovine testicular hyaluronidase and to select a preparation or a blend of several preparations to serve as the international standard. Progress has been made in obtaining material for an international standard for thrombin.

Veterinary Standards

The committee has noted a suggestion that existing biological standards should be available for veterinary use, and that the Expert Committee on Biological Standardisation should extend its scope to include standards needed for practice and research in veterinary medicine. They have agreed to establish an international standard preparation of Q-fever antiserum for use in the complement-fixation test, and, if possible in the agglutination test, for the serological diagnosis of Q-fever. Also to be established is an international standard for *Brucella abortus* antiserum for use in the agglutination tests for brucella infections.

The establishment has been confirmed of the second international standard for histolyticus antitoxin, now available at the Statens Seruminstitut, Copenhagen, and the third international standard for sulpharsphenamine and the international standard for D-tubocurarine, both of which are now available at the N.I.M.R., London.

As an appendix to the report there is published a complete and up-to-date list of all current biological standards.

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The Air Beef Story

Under the above heading Dr. MAX HENRY, B.V.SC., M.R.C.V.S., of Chatswood, New South Wales, sends us the following:—

B.H.P. These initials stand for the biggest and most impressive manufacturers of steel and ship building in Australia. They are familiar to every Australian as the abbreviation of the name of the Broken Hill Proprietary Company Limited. The quarterly review issued by the company is always interesting, and No. 2, Volume XXIX, of March, 1952, is no exception and is more surprising than is usually the case. To find on opening the journal devoted to the steel industry that the first article is headed "The Air Beef Story" is, to say the least, somewhat provocative. This article is the history of a new development in the marketing of beef from the northern parts of Australia through the adaptation of air traffic to the problem.

The areas to which this arrangement could most advantageously be developed include the northern part of Western Australia called the Kimberleys and part of the Northern Territory and Northern Queensland, but it might well be extended more widely. The production of beef cattle in the three areas referred to has been the only worthwhile permanent industry of those areas, although mining, particularly for gold, has at times occupied the attention of many of the inhabitants.

The present world situation regarding the production of beef makes it of some interest to consider this latest development. Up to the present the beef cattle raised in these areas have been destined for the supply of meat through the big abattoirs in Queensland, New South Wales and South Australia, and they have also supplied the annual kill at Wyndham Meat Works in the far north-west. Naturally, every endeavour is made to market these cattle in a fit condition for slaughter and as young as is practicable, but the distances which most of them must travel by road and rail to the markets of the east and south make it very difficult except in regard to a few cattle stations fortunately placed within a short distance of rail head. The biggest trouble met with in moving these cattle to market by road has been the water supply, though of course the condition of feed along the main stock routes was also of importance, and the methods of animal husbandry in these northern areas did not meet with sufficient success fully to control pleuro-pneumonia, cattle tick and tick fever. There was no question as to whether good cattle could be raised in many parts of these areas, but the difficulties in marketing, as indicated, have prevented the full development of a sound industry.

It has been a matter of considerable misfortune to Australia that, with the exception of Wyndham, most of the northern abattoirs closed down many years ago, and this forced the cattle southwards, a movement which was always a source of anxiety to the veterinary services of the southern and eastern States because of the danger arising from the disease conditions indicated above.

Up to a few years ago the watering points along the main stock

routes were station owned and travelling mobs had to be assisted by the station owners in connection with water supply. Under the present administration a serious attempt is being made to provide watering points, departmentally controlled, along the main routes. This work has been going forward with great activity associated with the appointment of Mr. A. L. Rose, B.V.SC., as Chief Veterinary Officer and Chief of the Division of Animal Industry of the Northern Territory.

The feasibility of linking up the marketing of beef with the air services associated with those areas was considered for some time and a practical demonstration of the possibilities was seriously tested in recent years when a particular station was selected on which to establish suitable buildings for the slaughter of cattle and from which the carcases of these cattle could be flown to Wyndham for storage. There is no reason why such a development, as one of the ways in which an increase in beef production could be brought about, should not be successful. From this station, which is in the Kimberleys, an increase in production was secured.

It is claimed in the B.H.P. article referred to that in three years the use of air traffic for the carriage of beef has increased the turn-over of cattle by 171 per cent. annually, the average weight of beef carcases by 8 per cent., and increased beef production by 188 per cent. per annum. The total output of first and second grade export beef was increased by 413 per cent.

Recently a very severe drought has afflicted most of the country mentioned, and the possibility of moving cattle away by road for immediate slaughter was negatived by the fact that, although at any given point there might be sufficient feed to enable the production of a somewhat limited number, the movement of these cattle to market was held up because the routes along which they would travel were very soon eaten bare.

It has always been a problem in the Northern Territory to get the cattle away young enough, and it was no rarity to find animals of 12 and 13 years old still consuming the feed. On the other hand, partly by the existence of road and trains, the stations close to Alice Springs and rail head were always in a position to market limited numbers at the fatstock market in Adelaide. From this development in the production and marketing of beef cattle in fairly prime condition there arose the possibility of developing the production of pigs, partly because at the inland abattoirs there was available all the offal from the kill, otherwise going to waste.

Further development of this industry will probably result in the production of meat meal, tallow, fertilisers and hides, enabling these items to be marketed, firstly for local use and secondly for export through the southern capitals. Every development of this type requires encouragement, since it is through the livestock that the northern parts of Australia must develop in the first place, though there is no reason to fear that properly planned crop growing could not be undertaken in selected areas. This stock-raising activity must result in an increase in the population of north Australia.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE DESIGNATION "GELDING"

Sir,—I would welcome the views of my colleagues on the correct application of the designation "gelding."

Recently I had to determine the designation of a six-year-old cob (castrated as a two-year-old by a well-known member and a surgeon of repute, and who certified that he had removed both testicles) because the animal had been noticed to "rig." Whether or not he had been "cut proud" or "cut rough" could not be determined, as the stumps of the severed cords had retracted into the abdominal cavity. There was a thickening and "puckering" of the skin of the scrotum on the left side but this was confined to it. When castrated, this had been done under the influence of a general anaesthetic.

I noticed no signs of "rigging" when I examined and my decision was that as the essential organs of reproduction (*i.e.*, testicles) had been removed he was a gelding.

I have consulted eminent members of the profession who are recognised as authorities on the horse, and their views are not unanimous, some suggesting that it would be wise to avoid this designation, but my own view is that any other designation or qualification of the term "gelding" would imply that a horse "cut proud" or "rough" would still be fertile.

Naturally, if "rigging" was observed during an examination for soundness, I would reject on the grounds that the horse did not comply with the standard definition of soundness handed down to us by the late Baron Parke, but I would still call him a gelding, if satisfied that both testicles had been removed.—Yours faithfully, J. F. D. TUTT, "Rothiemurchus," Winchester. *August 31st*, 1952.

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INDUCTION OF ANAESTHESIA BY THE INTRATHORACIC ROUTE

Sir,—Working on dogs and cats with semi-skilled or unskilled assistance I find many cases, brought to me for surgical interference, extremely difficult or quite impossible to anaesthetise by the intravenous route. Blood pressure may be low and the vein too flaccid to "raise," or the patient may be too fractious for an intravenous injection to be attempted. The intraperitoneal route is unsatisfactory in many cases, especially when the bladder or uterus is distended. I have had many cases where operation has had to be performed following an intraperitoneal injection of a carefully assessed dose of nembutal which has failed to produce anaesthesia; I, presumably, having made my injection into one or other of the abdominal viscera or, in the obese patient, into peritoneal fat.

For some time now it has been my practice, especially with Pekes and Scotties, for such conditions as pyometra, dystokia and urethral obstructions with cystic distension, to administer nembutal or pentobrocanal intrathoracically. I have found anaesthesia to be induced smoothly and much more rapidly than when given intraperitoneally. I have used this route many times and have seen no untoward results nor has it ever failed to produce satisfactory anaesthesia.—Yours faithfully, A. NOEL ORMROD, Arrow Park Road, Woodchurch, Wirral. *August 26th*, 1952.

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HORSE AMBULANCE TRAILERS

Sir,—I have read with interest the correspondence upon this subject which appeared in your issue of August 23rd and I agree with Mr. Rice that a comparatively inexpensive trailer could be devised which would suit the lifting of an injured horse, and, in addition, be satisfactory for the transport of healthy ones. Whether a false floor or a movable mattress be employed is a matter which can best be decided by experiment, and I have no doubt that after "trial and error" a standard technique and apparatus will be evolved to suit all circumstances. Mr. Rice asks whether an anaesthetised horse, lying on its side, could be passed through an opening not much more than 5 feet wide. I would say "Yes." The three sound legs would be hobbled together, in case of recovery from the anaesthetic, and the injured leg would be in suitably shaped and well-fitting splints to prevent further injury.

Upon arrival home, if the setting, pinning, or other method of repair cannot be effected immediately, the horse (having recovered consciousness) should be raised by suitable lifting tackle, as demonstrated at the R.V.C., and put in slings until the operation can be commenced. Chloroform or chloral would probably be the best anaesthetics.

I understand that Messrs. Rice Caravans, Ltd., are to carry out experiments with various equipment, after which your readers may hear more of the matter.—Yours faithfully, H. KIRK, "Croyland," 658, Finchley Road, Golders Green, N.W.11. *August 25th*, 1952.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange	Sheep Scab	Swine Fever
1st to 15th August, 1952	52	10	8	—	—	16
Corresponding period in—						
1951	14	—	32	—	—	71
1950	17	—	1	—	—	8
1949	8	—	15	—	1	—
1st Jan. to 15th August, 1952	416	469	142	—	1	620
Corresponding period in—						
1951	289	26	586	—	4	636
1950	250	16	101	—	19	51
1949	122	11	352	—	29	5